MOXA EtherDevice Switch

EDS-208 Series Hardware Installation Guide

First Edition, January 2006

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Overview

The EDS-208 series of MOXA EtherDevice™ Switches are entry-level 8-port Ethernet Switches that provide a cost-effective solution for industrial Ethernet connections. EDS-208 provides a choice of 12 to 45 VDC power input or 18 to 30 VAC. The switches can operate reliably in a temperature range of -10 to 60°C, and the rugged hardware design makes EDS-208 perfect for ensuring that your Ethernet equipment can be used in demanding industrial environments.

Package Checklist

MOXA EDS-208 is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- 1 EDS-208 or EDS-208-M-SC or EDS-208-M-ST
- Hardware Installation Guide
- MOXA Product Warranty booklet

Features

High Performance Network Switching Technology

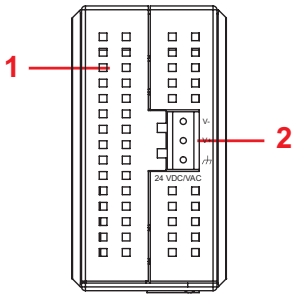
- 10/100BaseT(X) (RJ45), 100BaseFX (SC/ST type, Multi mode)
- IEEE 802.3/802.3u/802.3x
- Store and Forward switching process type, 1024 address entries

Industrial Design

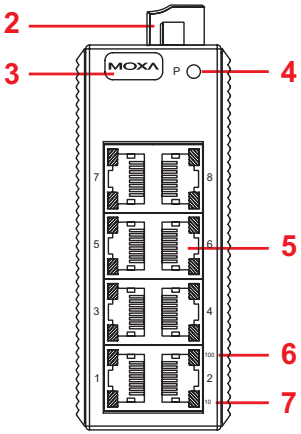
- Operating temperature ranges from -10 to 60°C
- Power inputs: 12 to 45 VDC or 18 to 30 VAC at 47 to 63 Hz
- IP30, plastic case
- DIN-Rail mounting ability

Panel Layout of EDS-208

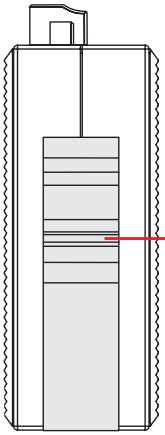
Top View



Front View



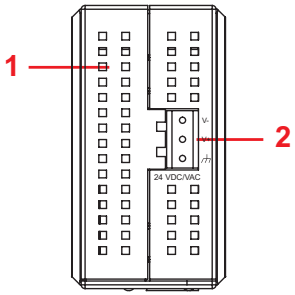
Rear View



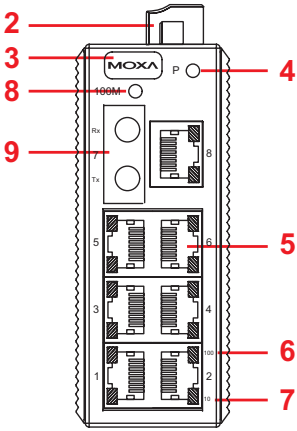
1. Heat dissipation orifices
2. Terminal block for power input and grounding
3. MOXA Logo
4. Power input LED
5. 10/100BaseT(X) Port
6. TP port's 100 Mbps LED
7. TP port's 10 Mbps LED
8. DIN-Rail kit

Panel Layout of EDS-208-M-SC/ST

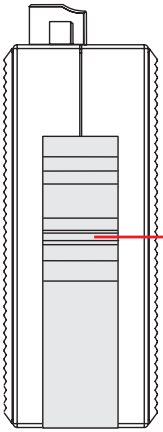
Top View



Front View



Rear View



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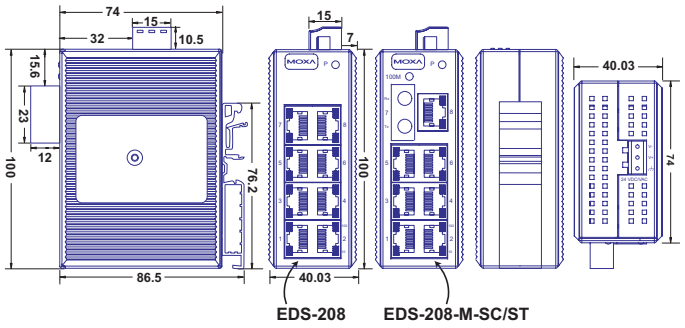
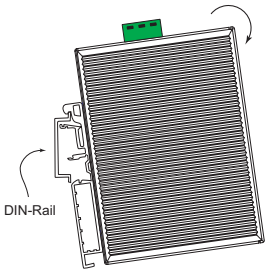
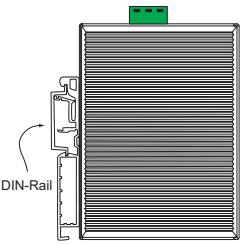
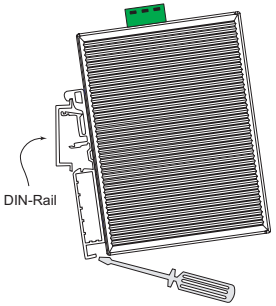
8. FX port's 100 Mbps LED
9. 100BaseFX Port
10. DIN-Rail kit

Mounting Dimensions (unit = mm)



DIN-Rail Mounting

The plastic DIN-Rail attachment plate should already be fixed to the rear panel of EDS-208 when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to EDS-208, make sure the DIN-Rail kit is situated towards the top, as shown in the figures below.

STEP 1: Insert the top of the DIN-Rail into the slot.	**STEP 2**: The DIN-Rail attachment unit will snap into place as shown below.
	
	To remove MOXA EDS-208 from the DIN-Rail, insert a flat-blade screw driver horizontally into the DIN-Rail kit under the EDS-208, and then pull it upwards and release EDS-208 towards you away from the DIN-Rail.

Wiring Requirements

ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your EDS-208.

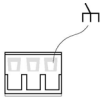
Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

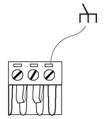
You should also pay attention to the following items:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
- NOTE: Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separated.
- It is strongly advised that you label wiring to all devices in the system when necessary.

Grounding EDS-208



Top View



Front View

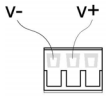
Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the right most contact of the 3-contact terminal block to the grounding surface prior to connecting devices.

ATTENTION

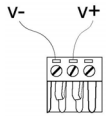
This product is intended to be mounted to a well-grounded mounting surface such as a metal panel.

Wiring the Power Inputs

The two left-most contacts of the 3-contact terminal block connector on EDS-208's top panel are used for both the DC and AC inputs of EDS-208. Top and front views of one of the terminal block connectors are shown here.



Top View



Front View

STEP 1: Insert the negative/positive DC or AC wires into the V-/V+ terminals.

STEP 2: To keep the DC or AC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.

STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on EDS's top panel.

ATTENTION

- Only connect to a class 2 power supply.
- Use 60/75°C copper (CU) wire 28-12 AWG only.
- Use a maximum torque of 4.5 in-lb.

Communication Connections

EDS-208 has 7 or 8 10/100BaseT(X) Ethernet ports, and 1 or 0 (zero) 100BaseFX (SC/ST-type connector) multi-mode fiber ports.

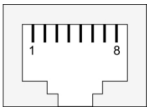
10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on EDS-208's front panel are used to connect to Ethernet-enabled devices.

Below we show pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports, and also show cable wiring diagrams for straight-through and cross-over Ethernet cables.

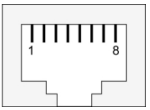
RJ45 (8-pin, MDI) Port Pinouts

8-Pin	Description
1	Tx+
2	Tx-
3	Rx+
6	Rx-

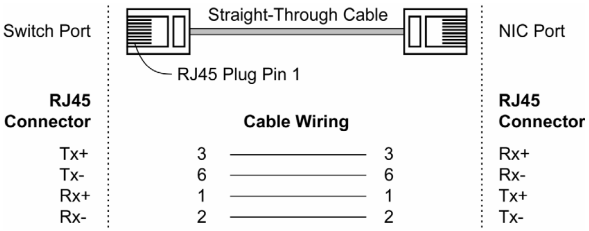


RJ45 (8-pin, MDI-X) Port Pinouts

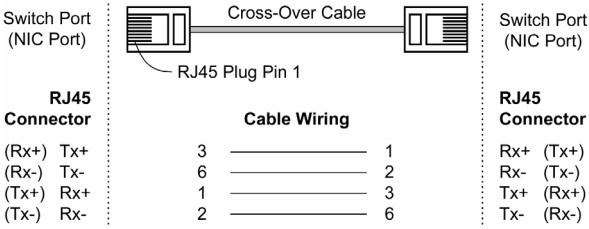
8-Pin	Description
1	Rx+
2	Rx-
3	Tx+
6	Tx-



RJ45 (8-pin) to RJ45 (8-pin) Straight-Through Cable Wiring



RJ45 (8-pin) to RJ45 (8-pin) Cross-Over Cable Wiring

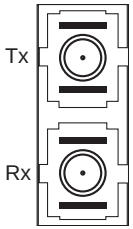


100BaseFX Ethernet Port Connection

The concept behind the SC/ST port and cable is quite straightforward. Suppose you are connecting devices I and II. Contrary to electrical signals, optical signals do not require a circuit in order to transmit data. Consequently, one of the optical lines is used to transmit data from device I to device II, and the other optical line is used to transmit data from device II to device I, for full-duplex transmission.

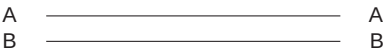
All you need to remember is to connect the Tx (transmit) port of device I to the Rx (receive) port of device II, and the Rx (receive) port of device I to the Tx (transmit) port of device II. If you make your own cable, we suggest labeling the two sides of the same line with the same letter (A-to-A and B-to-B, as shown below, or A1-to-A2 and B1-to-B2).

SC-Port Pinouts



SC-Port to SC-Port Cable Wiring

Cable Wiring



ST-Port Pinouts

ST-Port to ST-Port Cable Wiring

Cable Wiring

ATTENTION

This is a Class 1 Laser/LED product. To avoid causing serious damage to your eyes, do not stare directly into the Laser Beam.

LED Indicators

The front panel of EDS-208 contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
P	AMBER	On	Power is being supplied to the power input
		Off	Power is **not** being supplied to the power input
10 (TP)	GREEN	On	TP port's 10 Mbps link is active
		Blinking	Data is being transmitted at 10 Mbps
		Off	TP Port's 10 Mbps link is inactive
100 (TP)	GREEN	On	TP port's 100 Mbps link is active
		Blinking	Data is being transmitted at 100 Mbps
		Off	100BaseTX Port's link is inactive
100M (FX)	GREEN	On	FX port's 100 Mbps link is active
		Blinking	Data is being transmitted at 100 Mbps
		Off	100BaseFX Port's link is inactive

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect EDS-208's 10/100BaseTX ports to any kind of Ethernet device, regardless of how the Ethernet cable is wired. This means that you can use either a *straight-through* cable or *cross-over* cable to connect EDS-208 to Ethernet devices.

Dual Speed Functionality and Switching

EDS208's 10/100 Mbps switched RJ45 port auto negotiates with the connected device for the fastest data transmission rate supported by both devices. All models of EDS-208 are plug-and-play devices, so that software configuration is not required at installation, or during maintenance. The half/full duplex mode for the switched RJ45 ports is user dependent and changes (by auto-negotiation) to full or half duplex, depending on which transmission speed is supported by the attached device.

Switching, Filtering, and Forwarding

Each time a packet arrives at one of the switched ports, a decision is made either to filter or to forward the packet. Packets with source and destination addresses belonging to the same port segment will be filtered, constraining those packets to one port, and relieving the rest of the network from the need to process them. A packet with destination address on another port segment will be forwarded to the appropriate port, and will not be sent to the other ports where it is not needed. Packets that are used in maintaining the operation of the network (such as the occasional multi-cast packet) are forwarded to all ports.

EDS-208 operates in the store-and-forward switching mode, which eliminates bad packets and enables peak performance to be achieved when there is heavy traffic on the network.

Switching and Address Learning

EDS-208 has an address table that can hold up to 1,000 node addresses, which makes it suitable for use with large networks. The address tables are self-learning, so that as nodes are added or removed, or moved from one segment to another, EDS-208 automatically keeps up with new node locations. An address-aging algorithm causes the least-used addresses to be deleted in favor of newer, more frequently used addresses. To reset the address buffer, power down the unit and then power it back up.

Auto-Negotiation and Speed Sensing

All of EDS-208's RJ45 Ethernet ports independently support auto-negotiation for speeds in the 10BaseT and 100BaseTX modes, with operation according to the IEEE 802.3u standard. This means that some nodes could be operating at 10 Mbps, while at the same time, other nodes are operating at 100 Mbps.

Auto-negotiation takes place when a "live" RJ45 cable is connected to the switch, and then each time a LINK is enabled. EDS-208 advertises its capability for using either 10 Mbps or 100 Mbps transmission speeds, with the device at the other end of the cable expected to similarly advertise. Depending on what type of device is connected, this will result in agreement to operate at a speed of either 10 Mbps or 100 Mbps.

If an EDS-208 RJ45 Ethernet port is connected to a non-negotiating device, it will default to 10 Mbps speed and half-duplex mode, as required by the IEEE 802.3u standard.

Specifications

Technology	
Standards	IEEE802.3, 802.3u, 802.3x
Processing Type	Store and Forward, with IEEE802.3x full duplex, non-blocking flow control
Address Table Size	1,000 uni-cast addresses
Interface	
RJ45 Ports	10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Fiber Ports	100BaseFX ports (SC/ST connector)
LED Indicators	Power, 10/100 M (TP port), 100 M (FX port)

Optical Fiber	
	Multi mode
Distance	5 km
Wavelength, nm	1300
Min. TX Output, dBm	-20
Max. TX Output, dBm	-14
Sensitivity, dBm	-34 to -30
Recommended Diameter (Core/Cladding) µm	50/125 (1 dB/km, 800 MHz × km)
Power	
Input Voltage	12 to 45 VDC, 18 to 30 VAC (47 to 63 Hz)
Input Current @ 24 VDC	0.15 A (EDS-208) 0.25 A (EDS-208-M-SC/EDS-208-M-ST)
Input Current @ 24 VAC	0.22 A (EDS-208) 0.33 A (EDS-208-M-SC/EDS-208-M-ST)
Connection	Removable 3-contact Terminal Block
Overload Current Protection	1.1 A
Reverse Polarity Protection	Present
Mechanical	
Casing	IP30 protection, plastic case
Dimensions	40 × 109 × 95 mm (W × H × D)
Weight	170 g
Installation	DIN-Rail
Environment	
Operating Temperature	-10 to 60°C (14 to 140°F)
Storage Temperature	-40 to 70°C (-40 to 158°F)
Ambient Relative Humidity	5 to 95% (non-condensing)
Regulatory Approvals	
Safety	UL 508 (pending)
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS)
Shock	IEC 60068-2-27
Free Fall	IEC 60068-2-32
Vibration	IEC 60068-2-6
WARRANTY	5 years

MOXA Internet Services

Customer satisfaction is our number one concern, and to ensure that customers receive the full benefit of our products, Moxa has established on-line support services to provide technical support, driver updates, product information, and user's manual updates.

E-mail for technical support:

support@moxanet.com	(Worldwide)
support@moxa.com	(The Americas)

Website for up-to-date product information:

www.moxa.com